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Preface

The Golgi complex

This is the second special issue of *BBA Molecular Cell Research* to focus on the Golgi complex and in the more general sense on the secretory pathway within animal cells, plants, and yeast. Issue 1 appeared in 1998 and was assembled by an editorial team of Viki Allan, Rainer Duden, and Brian Storrie. That year was the centenary of Camillo Golgi's discovery of the subcellular structure that today we know as the Golgi complex or Golgi apparatus. At that time, the editorial team extended the hope that structure-function relationships of the Golgi complex would be clear by the bicentenary of the organelle's discovery. Presumably, at that point, all controversy in cell biology will vanish. Today the bicentenary is still distant and controversy remains, some old and some new.

Research on the Golgi complex has had its cyclical threads of controversy, while at the same time an increasing depth of information has come from the application of new technologies and approaches. Clearly, we know many more details than we did 7 years ago. Major advances have come from imaging techniques, further use of in vivo and in vitro assays, and the application of genetics in the form of both yeast genetics and reverse genetics. The complete sequencing of genomes and their public data banking have made initial molecular comparisons between diverse organisms possible with only a click or two of a computer mouse. Imaging methods such as green fluorescent protein (GFP), fluorescence recovery after photobleaching (FRAP), and fluorescence resonance energy transfer (FRET) have become standard parts of the toolbox. Completely new technologies such as proteomics and high-throughput screening which make the cataloging of hundreds of proteins that may be involved in various stages in the secretory pathway a relatively routine task today may well generate the Golgi complex of the future. Yet despite increased knowledge, we still struggle with frameworks to tie detailed observation and mechanism together into conceptual understanding. As before, concepts have gone in and out of favor and compete with one another for center stage. New themes, such as a growing appreciation of the inherent plasticity of the organelle and the role of the Golgi complex as a dynamic platform of organization of signaling pathways, have emerged over the last several years.

We have drawn together a set of skilled authors to cover in a balanced way the current state of the field. The articles are presented in the order of a guided tour through the secretory pathway in which the Golgi complex central to all aspects. The articles group together loosely under themes of "Imaging Techniques and Their Outcomes for the Golgi Complex and the Secretory Pathway" (Presley; Marsh), "Leaving the ER: The Road to the Golgi Complex" (Tan, Wang, Ong, and Hong; Watson and Stephens; Vaughan), "Targeting and Vesicle Fusion" (Lupashin and Sztul; Hong), "Transport Pathways through the Golgi Complex" (Hawes and Satiat-Jeunemaitre; Mironov, Beznoussenko, Polishchuk, and Trucco; Kartberg, Elsner, Fröderberg, Asp, and Nilsson), "Holding the Golgi Complex Together" (Donaldson; Beck; Short, Haas, and Barr; De Matteis, Di Campli, and Godi; Hicks and Machamer; Meyer), and "The Late Golgi Complex and Protein Sorting" (Traub; Bowers and Stevens; Rodriguez-Boulan and Müsch). In sum, by grouping the articles together in this order, we hope to highlight the state of understanding in individual areas and where controversy and disagreement exist.

The core strengths of this special issue rest with the individual authors and the referees. We hope that we as editors have, at least to some extent, succeeded in bringing together in one place a synthesis that is more than the sum of the parts. We freely acknowledge our failure to include all areas of importance. In part, it reflects our lack of foresight and failure to twist successfully enough arms. In part, it reflects the size of the task. We extend our appreciation to the great efforts of the expert reviewers who refereed and brought about the improvement of each of the articles included. Our thanks go to David Banfield, Francis Barr, Peter J. Cullen, Julie Donaldson, Paul Gleeson, Ben Glick, Gareth Griffiths, Hans-Peter Hauri, Chris Hawes, Jesse Hay, Fred Hughson, Cathy Jackson, Martin Latterich, Jennifer Lippincott-Schwartz, Martin Lowe, Irina Majoul, Michael McCaffrey, Carolyn Machamer, Fred Maxfield, Paul Moreau, Antonella de Matteis, Satyajit Major, Alexander Mironov, Sean Munro, Robert Piper, Rainer Pepperkok,

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Rainer Duden, London
John Presley, Montreal
Brian Storrie, Little Rock